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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/693,376	10/23/2003	Suan Jeung Boon	5353.1US (02-0240.01/US)	1671
24247	7590	09/08/2005	EXAMINER	
TRASK BRITT P.O. BOX 2550 SALT LAKE CITY, UT 84110			HAFIZ, MURSALIN B	
			ART UNIT	PAPER NUMBER
			2814	
DATE MAILED: 09/08/2005				

Please find below and/or attached an Office communication concerning this application or proceeding.

HFD

Office Action Summary	Application No. 10/693,376	Applicant(s) BOON ET AL.	
	Examiner Mursalin B. Hafiz	Art Unit 2814	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 January 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 6-13, 15, 17-20, 24 and 25 is/are rejected.
- 7) ☒ Claim(s) 2-5, 14, 16 and 21-23 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10/23/2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>10/23/03, 1/16/04, 5/3/04, 3/7/05</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 1, 6, 7, and 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vittu et al (US 6,713,876 B1) in view of Glenn et al (US 6,455,927 B1).

Regarding claim 1, Vittu discloses, in column 2 line 44 to column 3 line 23, Fig. 1 to 4, a method for assembling an electronic device package comprising:

forming a package shell [column 2 line 44, (2)] having an aperture [through-passage 5]

formed in a top surface thereof and a bottom-side cavity [annular hollow or countersink 7] formed in a bottom surface thereof and in communication with the aperture, the bottom-side cavity having an outside perimeter that is larger than an outside perimeter of the aperture to form a cavity top surface in the bottom-side cavity [see fig 3, label 2];

mounting an optically interactive microelectronic device [Fig.1, label 4 and 13 combined]

having an active surface within the bottom-side cavity such that at least a portion of the active surface is exposed through the aperture [Fig. 3, column 3 line 1-6]

depositing a transparent encapsulant within the aperture to cover the at least a portion

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of the active surface exposed therethrough [column 2 line 64 and claim 1]; and covering the aperture with a transparent lid [Fig. 3 label 21, Column3 line 15-17]

However, Vittu does not disclose the formation of at least one pad on at least the bottom surface of the package shell. Glenn taught an analogous device where solder pad is formed on the bottom surface of the package [1112]. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to form a solder pad on the bottom surface of the package of Vittu at least to connect the package with a external device, for example a printed circuit board [column 11 line 47- 63].

Regarding claim 6, Vittu disclose a method of mounting an optically interactive: microelectronic device comprising:

forming at least one terminal pad [11] on the cavity top surface;
forming at least one conductive element [9] on the active surface [4 and 13 combined] of the optically interactive microelectronic device; and
bonding the at least one conductive element to the at least one terminal pad [Fig 1].

Vittu fails to disclose that the terminal pad on the cavity top surface is operably coupled to the solder pad. However, Glenn teaches in fig. 11 the terminal pad [116] is operably coupled to the solder pad [1112]. It would have been obvious to one of ordinary skill in the art at the time of invention was made to couple the terminal pad to the solder pad at least to connect the microelectronic device to an external device through the solder pad [column 11 line 47 – 63].

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Regarding claim 7, Vittu discloses a method of forming at least one conductive element comprises forming at least one conductive bump [9] on the active surface of the optically interactive microelectronic device.

Regarding claim 9, Vittu teaches selecting the optically interactive microelectronic device to be an image sensor chip [column 3 line 3-5].

Regarding claim 10, Glenn discloses in fig. 11 the method of forming a package shell [1102] comprising ceramic [column 11 line 41-43].

Regarding claim 11, Vittu discloses the method of forming the transparent lid of glass [column 3, line 21-23].

2. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Vittu et al (US 6,713,876 B1) and Glenn et al (US 6,455,927 B1) as applied to claims 1 and 7 above and further in view of Hamzehdoost et al (US 5,687,474).

Regarding claim 8, Vittu fails to disclose the method of forming the conductive pad and the conductive bump to comprise gold. But, Hamzehdoost teaches analogous device where the material is gold [column 4, line 63-65]. It is well known in the art that gold has excellent electrical conductivity and prevents oxidation. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to substitute gold for solder to obtain the above-mentioned advantage.

3. Claims 12, 13, 17, 18, 20, 24, and 25 rejected under 35 U.S.C. 103(a) as being unpatentable over Vittu et al (US 6,713,876 B1) in view of Glenn et al (US 6,455,927 B1) and Nagano (US 5,357,056).

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Regarding claim 12, Vittu discloses, in column 2 line 44 to column 3 line 23, Fig. 1 to 4, a method for assembling an electronic device package comprising:

forming a package shell [column 2 line 44, (2)] having an aperture [through-passage 5]

formed in a top surface thereof and a bottom-side cavity [annular hollow or countersink 7] formed in a bottom surface thereof and in communication with the aperture, the bottom-side cavity having an outside perimeter that is larger than an outside perimeter of the aperture to form a cavity top surface in the bottom-side cavity [see fig 3, label 2];

forming a ledge surface in the bottom surface of the package shell around the bottom-side cavity [Fig.3, surface of 7];

covering the aperture with a transparent lid [Fig. 3 label 21, Column3 line 15-17]

mounting an optically interactive microelectronic device [Fig.1, label 4 and 13 combined]

having an active surface within the bottom-side cavity such that at least a portion of the active surface is exposed through the aperture [Fig. 3, column 3 line 1-6].

However, Vittu does not disclose the formation of at least one pad on at least the bottom surface of the package shell and covering the bottom-side cavity with a backing cap. Glenn taught an analogous device where solder pad is formed on the bottom surface of the package [1112]. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to form a solder pad on the bottom surface of the package of Vittu at least to connect the package with a external device, for example a printed circuit board [column 11 line 47- 63]. Nagano teaches an analogous device in Fig. 3 where the bottom-side cavity is covered with a backing cap [15]. It would have

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been obvious to one of ordinary skill in the art at the time of the invention was made to incorporate a backing cap in Vittu's device at least to secure the optical device properly.

Regarding claim 13, Glenn discloses in fig. 11 the method of forming a package shell [1102] comprising ceramic [column 11 line 41-43].

Regarding claim 17, Vittu disclose a method of mounting an optically interactive microelectronic device comprising:

forming at least one terminal pad [11] on the cavity top surface;
forming at least one conductive element [9] on the active surface [4 and 13 combined] of the optically interactive microelectronic device; and
bonding the at least one conductive element to the at least one terminal pad [Fig 1].

Vittu fails to disclose that the terminal pad on the cavity top surface is operably coupled to the solder pad. However, Glenn teaches in fig. 11 the terminal pad [116] is operably coupled to the solder pad [1112]. It would have been obvious to one of ordinary skill in the art at the time of invention was made to couple the terminal pad to the solder pad at least to connect the microelectronic device to an external device through the solder pad [column 11 line 47 – 63].

Regarding claim 18, Vittu discloses a method of forming at least one conductive element comprises forming at least one conductive bump [9] on the active surface of the optically interactive microelectronic device.

Regarding claim 20, Nagano discloses in fig. 3, backing cap comprising:

formation of a compression member on the backing cap [15]
back surface of the optically interactive microelectronic device [6] is in contact

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with the compression member.

Regarding claim 24, Vittu teaches selecting the optically interactive microelectronic device to be an image sensor chip [column 3 line 3-5].

Regarding claim 25, Vittu discloses the method of forming the transparent lid of glass [column 3, line 21-23].

4. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Vittu et al (US 6,713,876 B1), Glenn et al (US 6,455,927 B1), and Nagano (US 5,357,056) as applied to claim 12 above and further in view of Jerominek et al (US 2003/0111441 A1).

Regarding claim 15, Jerominek discloses in analogous device in Fig. 4, forming a depression [43] in the top surface of the package shell [38]; and seating the transparent lid [42] within the depression.

5. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Vittu et al (US 6,713,876 B1), Glenn et al (US 6,455,927 B1), and Nagano (US 5,357,056) as applied to claims 12, 17, and 18 above and further in view of Hamzehdoost et al (US 5,687,474).

Regarding claim 19, Vittu fails to disclose the method of forming the conductive pad and the conductive bump to comprise gold. But, Hamzehdoost teaches analogous device where the material is gold [column 4, line 63-65]. It is well known in the art that gold has excellent electrical conductivity and prevents oxidation. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to substitute gold for solder to obtain the above-mentioned advantage.

Allowable Subject Matter

Claims 2-5, 14, 16, and 21-23 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The prior art did not teach a method of depositing a transparent encapsulant comprises depositing the transparent encapsulant to a level that fills the aperture and covers a portion of the top surface of the package shell surrounding the aperture. Claim 3 and 5 are dependant on claim 2. The prior art does not teach integrally forming the transparent lid with the package shell during a ceramic firing process, hermetically bonding the transparent lid to the package shell with an adhesive material, forming at least one gold trace on the backing cap, hermetically sealing the backing cap to the ledge surface with an adhesive material, and forming the backing cap of a ceramic.

Conclusion


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mursalin B. Hafiz whose telephone number is 571-272-0237. The examiner can normally be reached on m-f 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on 571-272-1705. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

mbh


GEORGE ECKERT
PRIMARY EXAMINER